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Health Insurance for the Poor: Initial Impacts of Vietnam's Health Care Fund for the Poor

by

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Abstract

Vietnam's Health Care Fund for the Poor (HCFP) uses government revenues to finance health care for the poor, ethnic minorities living in selected mountainous provinces designated as difficult, and all households living in communes officially designated as highly disadvantaged. The program, which started in 2003, did not as of 2004 include all these groups, but those who were included (about 15% of the population) were disproportionately poor. Estimates of the program's impact—obtained using single differences and propensity score matching on a trimmed sample—suggest that HCFP has substantially increased service utilization, especially inpatient care, and has reduced the risk of catastrophic spending. It has not, however, reduced average out-of-pocket spending, and appears to have negligible impacts on utilization among the poorest decile.

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I. INTRODUCTION

Out-of-pocket spending continues to be the dominant source of health care finance in many developing countries. Where insurance does exist, it tends to be concentrated among formal sector workers, leaving those in the informal sector with a choice of whether to use services and risk impoverishing themselves and the family, or going without needed health care. This choice is especially stark for poor households, who in some countries end up using services less yet also spend a larger share of their income on health than the better off.

Several developing (and industrialized) countries have tried to tackle this problem by introducing subsidized or free government-run health insurance for the poor, and allowing (or requiring) nonpoor informal sector households to enroll on a contributory basis. In 1993, Colombia introduced a noncontributory or subsidized scheme within its social health insurance (SHI) program (Escobar and Panopolou 2003). In 2003, Mexico introduced its *Seguro Popular* scheme, a voluntary health insurance program operating alongside those for formal sector workers, into which all households except those in the poorest quintile (who are covered at the taxpayer's expense) are to contribute according to their income (Knaul and Frenk 2005). Within its *PhilHealth* SHI program, the Philippines has a tax-financed scheme for the indigent (Obermann et al. 2006). In 2003, China introduced a new voluntary and subsidized health insurance program for rural residents, with the contributions of the poor paid by the taxpayer (Liu and Rao 2006; Wagstaff et al. 2007). Also in 2003, Vietnam introduced a program where the poor (and other underprivileged groups) are (or soon will be) enrolled at the taxpayer's expense in the social health insurance scheme for formal sector workers.

Because many of these initiatives were introduced only recently, their impacts are only now being evaluated.[1] This paper reports the results of an impact evaluation of

[1] Inevitably because it is oldest, Colombia's reform that has been the most studied (cf. e.g. Panopoulu and Velez 2001; Trujillo, Portillo and Vernon 2005; Gaviria, Medina and Mejía 2006). For an early evaluation of China's and Mexico's recent reforms, see Wagstaff et al. (2007) and Gakidou et al. (2006).

Vietnam's scheme, known as the Health Care Fund for the Poor (HCFP).[2] Vietnam relies heavily on out-of-pocket payments to finance health care—nearly three-quarters of health spending is financed out-of-pocket (Knowles et al. 2005). A high fraction of Vietnamese households experience catastrophic and/or impoverishing out-of-pocket payments, and Vietnam fares worse in this respect than many other countries around the world; this is despite the fact that the poor use services less (Prescott 1997; Wagstaff and van Doorslaer 2003; Xu et al. 2003; O'Donnell et al. 2006; Van Doorslaer et al. 2006; Van Doorslaer et al. 2006).

HCFP replaced a program initiated in 2002 known as Free Health Care Cards for the Poor, in which 1.5 million people (out of a target of 4 million) were enrolled in Vietnam's SHI scheme.[3] Some provincial governments opted for a different approach, issuing the poor with a health card, and reimbursing facilities directly out of government funds. This initiative experienced a number of problems. Local governments were reliant on their own funds to finance the scheme, which posed a considerable challenge for local governments especially those where poverty rates were high. The amount of money per beneficiary that was mandated for the program was in any event relatively small. This led to narrow and shallow coverage: the monies transferred to the SHI agency (Vietnam Social Security, or VSS) were lower than its revenue per member in other schemes, and the amounts paid to providers were also limited. This led to care being rationed according to funds available, coverage of only some treatment costs (drugs, for example, were rarely covered), and a reluctance on the part of providers to treat patients in the scheme. People also had to apply to be included in the scheme, and the application process was long and complex; many were unaware of its existence. And finally, care was often available under the scheme only at one provider, often the local district hospital, which is often many miles from the homes of poor people.

HCFP marked a departure from this initiative: substantial central government finance is involved and provincial governments are also required to contribute some resources; clear eligibility criteria are laid down and people are automatically considered

[2] See Knowles et al. (2005) and Capuno et al. (2006) for further details of HCFP and the previous schemes it replaced.
[3] Vietnam had a number of schemes in place before the 2002 Health Care Cards initiative. All experienced a number of problems. See World Bank et al. (2001), Knowles et al. (2005) and Capuno et al. (2006) for further details.

for inclusion in the scheme; care under the scheme can be obtained at all public facilities from the commune level upwards; and central government has issued clear guidelines spelling out how the program is to be implemented, including a recommendation (now a requirement) that HCFP beneficiaries be enrolled in VSS's SHI scheme rather than facilities being reimbursed by the local health department for treating beneficiaries.

The impact evaluation of HCFP reported below is not a full-blown official evaluation[4], but rather an opportunistic study based on secondary data undertaken as part of the World Bank's research program on impact evaluation. It is inevitably somewhat partial. It covers only the first one-to-two years of the program's implementation, and hence runs the risk that the impacts may not yet have fully materialized. Moreover, it will not reflect the scheme as it is now, since a variety of changes were introduced at the start of 2006. It is also simply an impact evaluation, and so provides only quantitative evidence on the program's targeting and impact. It lacks the richness of a larger evaluation that might, for example, collect new data on local variations in program roll-out and implementation, qualitative data from officials, households and stakeholders on the program's successes and challenges, and so on. Despite its partialness, it is nonetheless potentially of some value. The design of HCFP is constantly being modified in the light of experience, and early quantitative evidence on impact may help to pinpoint issues worth addressing and provide ideas that could be built upon in a larger-scale official evaluation. Furthermore, while quantitative evidence on targeting and impact are only two components of a broader evaluation, they are nonetheless key ones; knowing stakeholders' views helps contextualize and interpret quantitative evidence, but they are not a substitute for it.

Like much of the recent literature on impact evaluation, the present study controls for observed heterogeneity through the use of propensity score matching. However, unlike many recent impact evaluations (cf. e.g. Wagstaff and Pradhan 2005; Chen, Mu and Ravallion 2006; Wagstaff et al. 2007; Wagstaff and Yu 2007), the present one employs single differences (comparing households in the program with ones outside it)

[4] The Government of Vietnam, with support from the Asian Development Bank, has recently begun a major evaluation of HCFP. It is hoped that this study may of some value to that effort.

rather than double differences (looking at differences in changes between 'treated' and 'untreated' households before and after a program's implementation). The reason for using single differences is that there are no suitable baseline data that would allow double-differencing to be undertaken. Some of the households in the 2004 Vietnam Household and Living Standard Survey (VHLSS)—the survey used in what follows—were interviewed two years before in the 2002 VHLSS. However, although the HCFP program did not exist at that date, its predecessors did, so already in 2002 there were poor people who had been assigned a health card or who had been enrolled in the health insurance program. If the aim is to get an estimate of the impact of being covered by one or other of the HCFP modalities versus not being covered (but eligible for the program), the 2002 VHLSS cannot therefore serve as a baseline. Aside from this, only a minority of households in the 2004 survey can be found in the 2002 survey, and the health utilization questions are different, making a double-difference somewhat heroic. The limitations of the single-difference approach used in the paper are discussed further below.

The paper is organized as follows. Section II provides a brief description of the HCFP program. Section III outlines the methods used to estimate its impact. Section IV presents the data and evidence on targeting. Section V presents the estimation results of the model used to estimate the propensity score for the analysis of impacts, and the results of balancing tests. These estimation results also shed further light on the issue of targeting. Section VI presents the estimates of the impacts of HCFP, and the final section (VII) contains a summary and discussion.

II. **VIETNAM'S HEALTH CARE FUND FOR THE POOR**

In October 2002, through an edict known as Decision 139[5], the government mandated all provincial governments to provide free health care to three groups: households defined as poor according to official government poverty standards introduced in November 2000; all households regardless of their own assessed income living in communes covered by a program set up as a result of another policy known as Decision 135 dating from 1998, which provides support and services to especially

[5] This section draws heavily on the excellent reviews of Knowles et al. (2005) and Capuno et al. (2006).

disadvantaged communes; and ethnic minorities living in the province of Thai Nguyen and the six mountainous provinces designated by Decision 186 as facing special difficulties[6]. Central government committed VND 52500 per beneficiary per year for the province's health care fund for the poor (HCFP), and required provinces to add a further VND 17500 though in practice few have done so to date.

Until recently, provinces were free to decide whether to use the VND 75000 to enroll HCFP beneficiaries in the government's social health insurance program, or to manage the risk themselves and provide direct reimbursement to providers. In this latter option, which has proved the most popular with provinces to date but which is being phased out through a 2005 government directive updating Decision 139, HCFP beneficiaries are issued with a free health care certificate or card. Confusingly, perhaps, some provincial governments that have opted for the direct reimbursement modality commission VSS to issue cards to HCFP beneficiaries, although VSS does not manage the risk in this modality, and it is the provincial government's health fund for the poor not VSS that directly reimburses providers. The VSS card is simply used to provide beneficiaries with a 'passport' to free care.

Whichever modality the province opts for, it is expected to provide the same benefits to HCFP beneficiaries as enjoyed be those compulsorily enrolled in the social health insurance program. HCFP beneficiaries are not supposed to pay deposits at health facilities, and no copayments. The package is, however, focused largely on services delivered by public hospitals and commune health centers (the coverage at the latter is mostly for drugs on the essential drugs list). The scheme does not cover non-prescription drugs bought from drug vendors and pharmacies, who are extensively used in Vietnam, and who often sell drugs that are supposed to be available only with a prescription. The package also excludes services delivered by other private providers, though recently—prompted by another 2005 government directive—VSS has begun contracting with private providers, and HCFP beneficiaries will have the same entitlements vis-à-vis private providers as other people enrolled in the social health insurance program. Unsurprisingly, but importantly because of their pervasiveness in Vietnam, the package

[6] These included Cao Bang, Bac Kan, Lao Cai, Ha Giang, Son La and Lai Chau.

excludes informal payments made by patients to providers. In practice, there is a strong bias in reimbursements towards higher-level facilities and inpatient care: in 2004, 40% of the HCFP budget went to provincial hospitals, 34% to district hospitals, and 20% to commune health facilities; and nearly 60% of the budget in both 2004 and 2005 was spent covering the costs of inpatient care. These figures mask variations across provinces, which may reflect choice of modality, as well as different ways of implementation. For example, some provinces operating the direct reimbursement modality (Lao Cai is an example) do not actually reimburse providers for delivering care, but rather divide up the budget and allocate specific amounts to facilities, with facilities themselves being expected to meet any excess over their HCFP allocation out of other revenues.

The identification of HCFP beneficiaries has built upon processes that had already been in place for some time. The communes that are covered by Decision 135 are well known. In fact, the problem has not been identifying them but rather ensuring that provinces are aware of their obligation to include residents of Decision 135 communes in the HCFP program. A list of ethnic minority households already existed for use in another government program. The toughest group to identify has been the poor. But even here, local governments have been able to build on lists of officially poor households produced for other government programs. Further household surveys are conducted by commune officials (in part to collect information on household members), and the proposed list of HCFP beneficiaries is then discussed and voted upon at a public meeting presided over by the village or commune leader. Officials from the district government's labor and social affairs offices then check the list, which could be revised before it is sent to the provincial department of labor and social affairs for final approval.

III. **METHODS**

The impacts of HCFP are estimated by comparing out-of-pocket payments and utilization between those covered by HCFP and comparable individuals not covered. Comparability is assessed by means of propensity score matching, the propensity score measuring the closeness (in terms of a vector of observable characteristics) of 'treated' and 'untreated' individuals. The score is simply the predicted probability of an individual

being covered by HCFP. A treated individual's outcome is compared with a counterfactual outcome, formed as a weighted average of the outcomes of untreated individuals, where the weights reflect the propensity scores, the exact weighting scheme depending on the variant of PSM used (discussed below). The differences are then averaged to get the average treatment effect (on the treated).[7]

This approach ensures that account is taken of the fact that households selected for HCFP coverage differ in a variety of observable respects from those not selected; failure to take this into account would result in biased estimates of the impact of HCFP. Individuals in the 'treated' and 'untreated' groups who are too dissimilar from the other group are discarded, and the focus is on a subsample for which good matches can be found for the treated individuals in the untreated group. What this approach does *not* do is to take into account the possibility that individuals are selected in part on the basis of *unobservable* variables and these variables also influence outcomes. As indicated in the Introduction, the frequently used approach of double-differencing with panel data and sweeping out time-invariant unobservable variables is not an option in this case, since it requires that the program has not yet been implemented in the baseline, and the only survey that could serve as a baseline (the 2002 VHLSS) was undertaken after the precursors to HCFP has already started.

Are there reasonable grounds for believing there to be selection into HCFP on unobservables? And are the likely biases likely to be large? Certainly, there are stories one could tell. Ethnicity is, of course fixed, at least in principle, and cannot be influenced by unobservables that also influence out-of-pocket spending and health utilization. But it might be *correlated* with such unobservables. The same is true of whether or not someone lives in a commune covered by Decision 135. Which direction such unobservables bias the estimated impact of HCFP is unclear. In the case of poverty status, the direction of bias seems clearer. In this case, the indicator determining eligibility could indeed be influenced by unobservables. Local officials may be tempted to err on the side of including a near-poor household that is known to have a history of high medical

[7] For excellent reviews of the recent impact evaluation literature, see Imbens (2004), Blundell et al. (2005) and Ravallion (2005). For a useful practical guide to PSM, see Caliendo and Kopeinig (2005).

expenses or of needing care and finding it unaffordable. While this information may be known by the commune official and the villagers, it is likely to be unobservable in the survey data. In this case, the program's impact on utilization will be overestimated by the methods used—some of those included in the program would have had high rates of utilization anyway. And the reduction in out-of-pocket payments might be underestimated; the bias might in fact lead one to concluding that the program *increases* out-of-pocket payments.

These possible biases are worth keeping in mind. But are they likely to be large? It could reasonably be argued that they ought to be smaller in the case of HCFP than in the case of an insurance scheme where people choose to participate, as in, say, China's new rural health insurance program, or where they have to apply to be considered for inclusion, as in, say, Colombia's noncontributory health insurance scheme and Mexico's *Seguro Popular* scheme (in both cases, households have to request to go through an assessment process to have their eligibility determined). In such settings whether or not someone is in the program is partly the result of their own decisions, and is potentially *influenced* by unobservable variables rather than simply being correlated with them. The bias due to unobservables seems likely to be larger in such cases than in the present one. Nonetheless, the possibility of bias needs to be borne in mind.

In PSM, the propensity score is typically estimated by means of a probit, where the two outcomes are whether the person is in the program or not. In this case, people are classified as being covered by HCFP if they either have a free health card or have been given free health insurance.[8] The propensity score is the predicted probability of being covered by HCFP. The (potential) control group is formed from nonbeneficiaries *who are eligible for HCFP*; this group represents the comparison group of most relevant to policy. After the estimation of the propensity scores, ineligible individuals are dropped from the analysis. Additional cases (both treated and untreated) were also dropped to further

[8] Results were also obtained using a multinomial logit model, where the base outcome is 'uninsured', the two HCFP modalities are treated as separate outcomes, and so too are each of the various other insured groups (the compulsorily insured, the voluntarily insured, young people insured through their school, people enjoying insurance by virtue of their meritorious status, etc.). Associated with each of the insured outcomes is a predicted probability, defined relative to the base outcome 'uninsured'. This allows for the possibility that the relative importance of different factors in influencing whether someone is covered by HCFP may vary between the two HCFP modalities. In the event, the results were very similar to those reported here.

improve comparability. The approach adopted in this paper is that suggested by Crump et al. (2006), who suggest trimming the sample in such a way as to minimize the variance of the estimated average treatment effects. The implications of this for the sample used are discussed further below. *All* the control group cases retained in the analysis are used to construct the counterfactual outcome for the treated individuals (i.e. the HCFP beneficiaries) via kernel matching.[9] This can be thought of as a weighted regression of the outcome on the treatment indicator variable, the kernel weights being a decreasing function of the absolute difference in propensity score between the treated and untreated unit (Smith and Todd 2005).[10] The sensitivity of the results to the choice of estimator are checked by matching treated and untreated cases via weights based directly on the propensity score. This estimator can also be implemented as a weighted regression of the outcome on the treatment indicator, where the weight is one for a treated unit, and $P/(1-P)$ for the untreated unit, P being the (estimated) propensity score (cf. Imbens 2004). The regression implementation reduces the computational burden, substantially in the case where there are many outcome indicators.[11] A further attraction is that it facilitates estimates of differences in impact across subsamples. In the present context, given the specific focus of the program on the poor, an obvious dimension along which to explore differential impact is income. By regressing the outcome on the treatment indicator, income (or, more accurately, consumption) category dummies, and interactions between the two, weighting the regression by the kernel or propensity score weights, one can obtain estimates of the impacts for the different income groups.[12] The regression using propensity score weights leads directly to robust standard errors. In the case of kernel matching, standard errors are obtained through bootstrapping with 100 replications.[13]

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[9] Cf. nearest-neighbor matching which results in a further dropping of cases that are not close enough in terms of their propensity scores.

[10] A normal (Gaussian) kernel was used with a bandwidth of 0.06.

[11] The regression routine in Stata is much faster than psmatch2 or other matching routines. The kernel weights need be estimated just for one outcome (which can be done using psmatch2), and then used in regressions for the other outcomes.

[12] This method also provides a simple way to obtain impacts for different income groups using the DD *without* matching. With or without matching (i.e. weighting), the impact for a particular income group is the sum of the coefficient on the NCMS treatment indicator plus the coefficient on the interaction between the treatment dummy and the income group dummy.

[13] These turn out to be similar in fact to those obtained from the regression. The reservations that have been expressed about bootstrapping standard errors in matching do not apply to the kernel method, because it does not run into the discontinuities that arise in nearest-neighbor matching (see e.g. Imbens 2004).

IV. **DATA, DECSRIPTIVE STATISTICS AND TARGETING**

The 2004 VHLSS covers just over 9000 households and just over 40000 individuals. Interviews were conducted between May and November 2004. The survey is the fourth in a series of general purpose household surveys conducted over the last 15 years in Vietnam, the first two being conducted jointly by Vietnam's Government Statistical Office and the World Bank in 1993/94 and 1997/98. A major strength of the 2004 VHLSS, like the earlier surveys, is its comprehensive approach to the measurement of household consumption: particular care is taken to capture the value not just of what people buy of what they produce themselves or obtain through nonfinancial transactions; the consumption measure also includes the value of housing.

Table 1 reports descriptive statistics for the outcomes studied for both the full sample and those eligible for HCFP. The first few relate to out-of-pocket payments for health care over a 12-month period. Total per capita out-of-pocket spending at VND 275 is equivalent to 6% of per capita household income (cf. **Table 2**). As many as 32% of individuals live in households recording catastrophic out-of-pocket payments, defined here as spending that is in excess of 10% of nonfood consumption. Nearly one quarter of household out-of-pocket payments are for non-prescribed medicines, with the rest being split equally between outpatient and inpatient expenses. Vietnamese record, on average, one outpatient consultation a year, but only 30% recorded one or more outpatient visits in the 12 months prior to the survey. By contrast, 7% recorded an inpatient spell. Commune health stations and district hospitals are the most frequented type of government facility, but private providers are used extensively—13% of the sample visited at least one during the previous year. Data from the 2001/02 Vietnam National Health Survey suggest that these utilization estimates are probably underestimates. Below, it is assumed that underreporting is invariant with respect to selection into HCFP.

Table 2 reports descriptive statistics for insurance coverage, including coverage by HCFP, as well as for the determinants of coverage. According to the VHLSS, 9% of the sample had been given a free health certificate, and a further 5% had been provided

with health insurance for the poor. To put the coverage rate of 14% in context[14], 10% of the sample had been officially classified as poor by their commune in 2003, 25% of the sample said they were a beneficiary in some way from Decision 135 (the poor commune program), and 7% of the sample belonged to an ethnic minority and lived in a designated disadvantaged mountainous province. A small fraction of the sample (4%) falls into all three categories. The fraction of the sample falling into none is 69%, so 31% of the sample is eligible for HCFP.

The 14% of the sample that is covered is disproportionately poor: the concentration curve for the HCFP scheme in **Figure 1** is far above the diagonal; the poorest 10% of the population accounts for over 30% of HCFP beneficiaries, and the poorest 20% of the population accounts for just over 50% of beneficiaries. **Figure 1** also shows that ethnic minorities in designated disadvantaged mountainous provinces and the officially poor are also heavily concentrated among the lower per capita consumption groups, more so than HCFP beneficiaries. This reflects the fact that while Decision 135 beneficiaries are also disproportionately poor, they are less concentrated among the lower per capita consumption groups than are ethnic minorities in designated disadvantaged mountainous provinces and people officially classified as poor. The area-based targeting associated with the decision to enroll all members of Decision 135 communes, irrespective of their household income, inevitably reduces the degree to which HCFP targets poor households.

Also included in **Table 2** are the descriptive statistics of variables that might plausibly affect coverage through one or other of the HCFP modalities. In principle, none of these additional variables ought to influence inclusion in HCFP once account has been taken of official poverty status, whether the household is an ethnic minority household living in a designated disadvantaged mountainous province, and whether it is located in a commune benefiting from Decision 135. However, because HCFP coverage falls below the target rate, the additional variables in **Table 2** may influence whether the individual is covered by HCFP. Low levels of per capita household consumption, literacy and education—for given official rates of poverty, ethnic composition and numbers of

[14] Capuno et al. (2006) estimate coverage at 16% using administrative data.

Decision 135 communes—may prompt local officials to roll out HCFP faster than they might otherwise have done.

V. PROPENSITY SCORE ESTIMATION AND BALANCING

Table 3 reports the results for the probit model used to obtain the propensity scores. As well as providing the basis for the propensity scores for the matching procedure, the results in **Table 3** are of intrinsic interest, because they shed further light on the targeting of the HCFP program. As intended, being classified as officially poor significantly increases the chances of having a free health card or having health insurance for the poor. Also, as intended by HCFP, being a beneficiary of Decision 135 (the disadvantaged commune program) and being an ethnic minority household in an officially designated disadvantaged mountainous province also significantly raises the chances of being covered by one or other of the HCFP modalities.

In addition to these three official determinants of HCFP coverage, several other variables included in the model also significantly affect the chances of being covered by HCFP. Household per capita income also exerts a statistically significant effect on the probability of being included, with the better off being less likely to be included, though the effect is not linear. Households with an elderly head are also more likely to be covered by HCFP. Households with illiterate heads are more likely to be covered. The head's education also affects the probability, but not in a monotonic fashion. Households in urban areas, other things equal, have a significantly lower chance of being covered by HCFP. Households living in regions other than the Northeast and South central Coast are more likely to be covered, other things equal, than households living in omitted region (the Red River Delta).

Figure 2 shows the histogram for the propensity scores (the predicted probability of being covered by HCFP) for those not covered by HCFP and those actually covered by HCFP. The distribution for the uncovered is heavily skewed, with the bulk of cases having a very small probability of being covered. There is, however, a long right-hand tail. With the large sample size of the survey being used, and the large fraction that fall

into the uncovered category, this means that there are plenty of individuals with appreciable probabilities of being covered by HCFP but who are in fact not included in the scheme. This is, of course, essential if the matching is to be done over a meaningful range of the propensity score. The HCFP beneficiaries, by contrast, are not heavily concentrated in one part of the propensity score distribution. (One might have expected them to be heavily concentrated at the right side.) Indeed, there is an appreciable number who are included and yet have a low relatively propensity score. Applying the trimming method suggested by Crump et al. (2006), produces optimal propensity score cutoff points of 0.088 and 0.911. Of the 4627 HCFP individuals in the eligible sample, 474 were dropped; and of the 7800 uncovered but eligible individuals in the sample, 1884 were dropped (**Table 4**). Thus the results below are based on a comparison between 4153 individuals covered by HCFP and 5916 eligible but uncovered individuals.

Table 5 reports the results of the balancing tests. The sample is the trimmed sample of HCFP eligible individuals, and the variables used in the probit model have been standardized with reference to the means and standard deviations of the subsamples of nonbeneficiaries and beneficiaries. The idea is that once the untreated observations have been appropriately weighted, and the sample has been trimmed suitably, there should be no association between treatment status and each standardized covariate. The first column in each table shows the standardized differences before matching. The second column shows the differences on the common support after weighting using the propensity score, and the third the standardized differences using the kernel-based weights, again on the trimmed sample. In **Table 5**, the trimming of the sample and both methods of weighting result in a much greater degree of balance in the covariates. In the kernel weighting approach, the mean standardized difference between the HCFP beneficiaries and the uninsured is reduced by over 80%. Even after weighting, however, some significant differences remain. So, the bias due to observables—while substantially reduced through the trimming and use of PSM—might not be entirely eliminated. This is especially true where the propensity scores are used as weights.[15]

[15] This may be because the propensity scores are directly derived from the probit which is estimated on the full sample, while the kernel weights are functions of the propensity scores, where the kernel functions are estimated on the eligible subsample.

VI. **IMPACTS**

Table 6 and **Table 9** report the estimates of HCFP impacts on the sample as a whole and by per capita consumption decile (the deciles of the full sample, not the subsample of HCFP eligible individuals). Included in are the outcomes among HCFP beneficiaries, the outcomes among the uninsured, the raw differences before matching, the differences after matching using propensity scores as weights, and the differences after matching using kernel weights. In the latter case, the t-statistics are based on bootstrapped standard errors with 100 replications. The decile-specific ATT estimates reported in **Table 9** were obtained using kernel weighting. To check the sensitivity of the results to one choice made in modeling exercise, **Table 7** presents matching estimates obtained by deleting ineligible individuals before running the probit model and then defining the trimmed sample based on these scores. **Table 8** also presents OLS estimates of the program's impacts, both for the full sample (of eligible individuals), and on the trimmed subsample; the equation estimated is the outcome variable regressed on the HCFP dummy and the covariates entered in the probit model.

The unmatched estimates point to HCFP significantly reducing out-of-pocket payments and the amount paid out-of-pocket per visit and per inpatient episode. These effects disappear, however, once matching is undertaken, irrespective of which weighting method is used, and irrespective of whether the ineligible individuals are dropped before or after estimating the probit model. They disappear even in the OLS model. The kernel estimates—which are probably rather more reliable, given the better balancing achieved—point to a zero impact on average out-of-pocket spending, while the estimates obtained via the propensity score weights suggest that if anything HCFP has *increased* out-of-pocket spending. This differential pattern is evident whichever sample is used to estimate the probit. The only type of spending where there is some evidence of HCFP exerting downward pressure is on nonprescribed medicines, but this is significant only in one specification. While the estimates imply that HCFP may not have reduced average out-of-pocket spending, all estimators suggest it reduced the risk of *catastrophic* out-of-pocket spending, by 3-4 percentage points. This estimate is fairly insensitive to the choice of estimator. It is noteworthy, however, that even with the coverage against out-of-pocket

payments that HCFP provides, 32% of HCFP beneficiaries experienced catastrophic out-of-pocket spending.

The lack of impact on out-of-pocket spending reflects the other main finding from the results—the large impacts that HCFP seems to have had on utilization. The effect is most pronounced for inpatient care: HCFP is estimated to have increased the probability of an inpatient spell by 30%, but the probability of an outpatient visit by only 16%; the number of inpatient spells by around 45%, but the number of outpatient visits by only around 20%. The marked increase in utilization of inpatient services helps explain the lack of reduction in out-of-pocket spending on inpatient care—a negligible change in cost per admission coupled with a rise in quantity of services used. The extra episodes of care brought about by HCFP have been delivered in just three of the nine types of facility examined: commune health stations, district hospitals, and provincial hospitals. None of the other public facility types have been significantly impacted by HCFP, with the possible exception of village clinics but the evidence is very weak. The private sector, by contrast, *has* been significantly affected by HCFP, but the effect is *negative*: HCFP has encouraged people to switch from private providers to public ones.

Table 9 suggests that HCFP's impact on average out-of-pocket spending has been similar for the poor and better off, but its impact on catastrophic spending has been felt largely among the bottom quintile. By contrast, as far as utilization is concerned, the impacts of HCFP seem to have been *smallest* among the poor. Indeed, among the poorest decile, there is barely any evidence of significant impacts of HCFP on utilization at all. Among the second decile, there are five significant utilization impacts in **Table 9**, while among the richest 80% of the eligible subsample (most eligible individuals are in the bottom half of the income distribution, not the upper half), there are seven significant utilization impacts. Furthermore, HCFP has not significantly affected the use of the private sector by the poorest 10%—the significant (negative) impacts are to be found among the other deciles.

VII. **DISCUSSION AND CONCLUSIONS**

On the program's coverage, there is good news and bad. The good news is that HCFP is very well targeted on the Vietnam's poor: the poorest 20% of the population accounts for just over 50% of HCFP beneficiaries. The bad news—known already to the government—is that the program (at least as of 2004) was not covering all the intended groups: coverage ought to have been 31% or so in 2004; in the event, it was around 15%. On impact, there is also good news and bad. The good news is that the program appears to be increasing the utilization of services quite considerably, and reducing the risk of catastrophic out-of-pocket spending. The bad news (or potentially bad news) is threefold. First, there is no perceptible impact on (average) out-of-pocket spending, and even with HCFP coverage poor households are left spending a high share of their modest income on out-of-pocket health expenses and at considerable risk of catastrophic spending. Second, the utilization impact is far more pronounced for inpatient care than outpatient care. This may not necessarily be the most cost-effective way of improving the health of poor Vietnamese households, and may leave them facing costs—including transport costs, informal payments, etc.—that are higher than necessary. Third, the impacts on utilization are larger among the better off: among the poorest decile, utilization impacts are rarely significant.

What do the results suggest for fine-tuning of HCFP? The probit results in **Table 3** suggest that the shortfall of coverage from the target rate has something to do with regional differences in implementation of the HCFP program, while the concentration curves in **Figure 1** suggest that tighter targeting could be achieved by dropping residence in a Decision 135 commune as a qualification. A number of factors could help explain the negligible impact of the program on (average) out-of-pocket spending. It is possible that facilities may be permitted to levy some copayments. Some spending recorded in the survey may include spending for hotel and 'nonessential' items used by inpatients (e.g. blankets, dressings, etc.). It is also highly plausible that the out-of-pocket payments recorded in the survey include informal payments, which of course are not reduced by the program. With inpatient care increasing so dramatically as a result of the program, such spending may well increase, offsetting at least in part the fall in fees and other costs

covered by the program. Whether the especially large increase in inpatient care is a good thing is hard to say in the absence of a study that determines whether the (extra) care being delivered is called for given the diagnoses of the patients involved, and the most cost-effective way of improving their health. Finally, the smaller impacts among the poorest decile undoubtedly have much to do with the barriers that the poor face in using health services on top of the fees and drug costs they incur—the transport costs, the informal payments, the lost income, and so on. Others face these costs as well of course, but at least some of them (e.g. transport costs) may be higher for the poor; and *as a share of income* they are almost certain to be higher. Options worth exploring would be to subsidize the transport costs of the poor, or to pay them a cash sum when they use health services, as in, for example, Mexico's PROGRESA (now OPPORTUNIDADES) conditional cash transfer scheme (cf. e.g. Gertler 2004).

Figure 1: Concentration curves for HCFP coverage
and official determinants of HCFP status

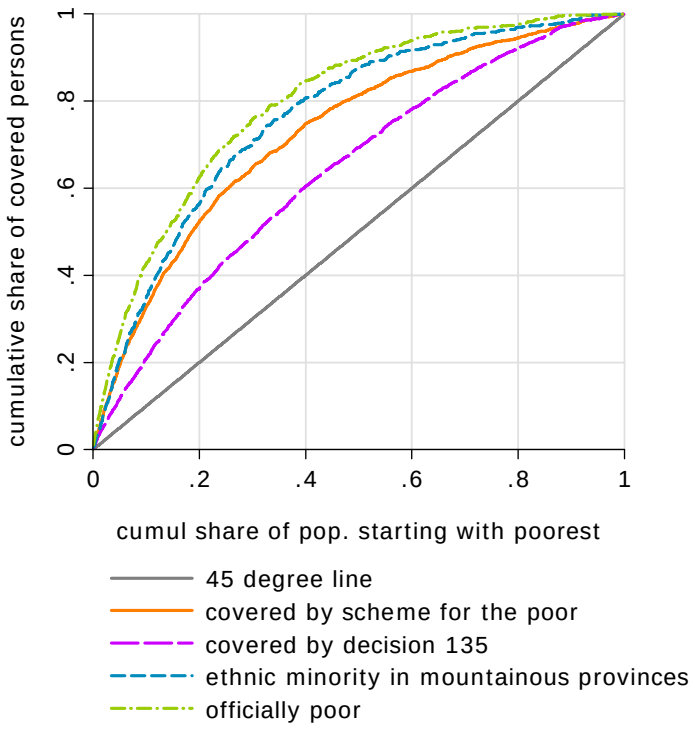
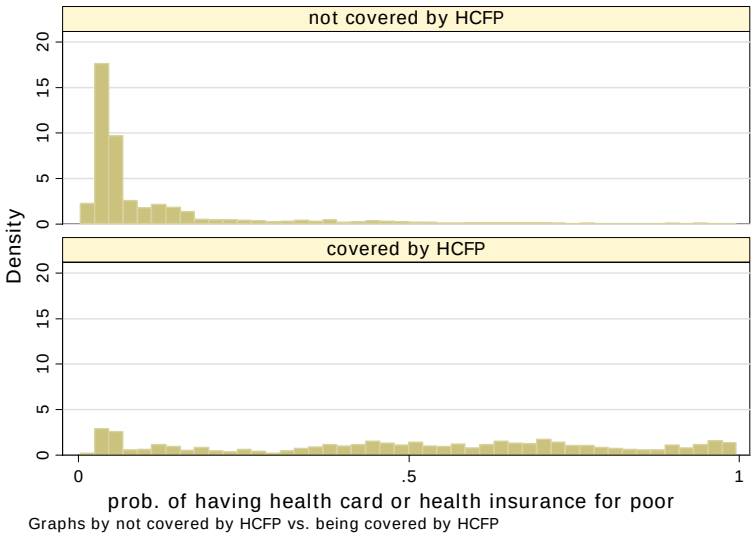


Figure 2: Propensity score histograms

(a) Full sample



(b) Eligible subsample

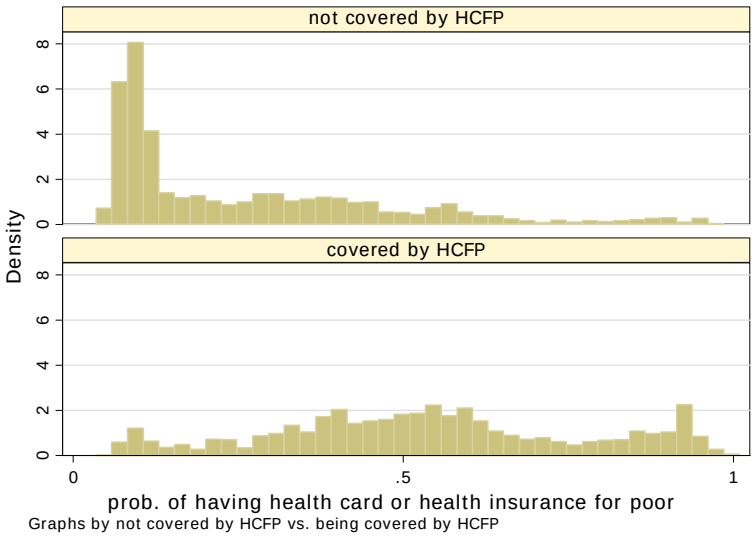


Table 1: Descriptive statistics—outcomes

	Full sample		HCFP eligible	
	Mean	Std. Dev.	Mean	Std. Dev.
Total out-of-pocket payments	274.17	771.79	196.76	667.32
Catastrophic (>10% nonfood consumption)	0.32	0.47	0.33	0.47
Outpatient expenses	100.24	583.82	65.02	411.53
Inpatient expenses	110.81	1241.36	88.64	1236.18
Outpatient expenses per visit	122.24	369.81	94.76	321.99
Inpatient expenses per admission	1227.08	2876.78	796.83	2411.27
Non-prescribed medicine expenses	59.44	138.87	41.22	94.13
Medical equipment expenses	3.68	21.99	1.88	11.34
# outpatient visits	0.99	2.73	0.82	2.31
# inpatient spells	0.10	0.49	0.11	0.59
Outpatient visits Yes	0.31	0.46	0.29	0.45
Inpatient spells Yes	0.07	0.26	0.08	0.27
Village station Yes	0.01	0.10	0.01	0.10
Commune center Yes	0.09	0.29	0.13	0.33
Regional clinic Yes	0.02	0.12	0.02	0.12
District hospital Yes	0.07	0.25	0.08	0.27
Provincial hospital Yes	0.06	0.23	0.04	0.20
Central hospital Yes	0.01	0.11	0.01	0.09
Other govt hospital Yes	0.00	0.06	0.00	0.05
Private provider Yes	0.13	0.33	0.09	0.28
Traditional healer Yes	0.01	0.09	0.01	0.09
N	40,440		12,427	

Table 2: Descriptive statistics—HCFP status and determinants

	Full sample		HCFP eligible	
	Mean	Std. Dev.	Mean	Std. Dev.
Insurance status				
Free health certificate	0.09	0.29	0.22	0.41
Insurance for the poor	0.05	0.22	0.15	0.36
Insurance for people of merit	0.03	0.18	0.05	0.21
Student insurance	0.05	0.23	0.03	0.17
Compulsory insurance	0.14	0.35	0.10	0.30
Voluntary insurance	0.01	0.10	0.01	0.09
Other insurance	0.00	0.06	0.00	0.07
Determinants of insurance status				
Poor in 2003	0.10	0.30	0.32	0.47
Decision 135 beneficiary	0.25	0.43	0.81	0.39
Ethnic minority	0.18	0.39	0.42	0.49
Ethnic minority x Mountainous province	0.07	0.25	0.21	0.41
Per capita consumption	4235.91	3651.33	2805.27	2016.91
Male household head	0.80	0.40	0.84	0.37
Age of household head	48.60	13.42	46.75	12.94
Literate household head	0.91	0.28	0.86	0.35
Education grade 1—household head	0.02	0.13	0.02	0.14
Education grade 2—household head	0.06	0.23	0.06	0.24
Education grade 3—household head	0.07	0.26	0.07	0.26
Education grade 4—household head	0.07	0.25	0.08	0.27
Education grade 5—household head	0.11	0.32	0.12	0.33
Education grade 6—household head	0.06	0.23	0.06	0.23
Education grade 7—household head	0.06	0.23	0.06	0.23
Education grade 8—household head	0.04	0.20	0.04	0.21
Education grade 9—household head	0.23	0.42	0.22	0.42
Education grade 10—household head	0.03	0.16	0.02	0.14
Education grade 11—household head	0.02	0.15	0.02	0.14
Education grade 12—household head	0.16	0.37	0.09	0.28
Urban	0.23	0.42	0.12	0.33
Northeast	0.14	0.35	0.24	0.43
Northwest	0.06	0.23	0.14	0.35
North Central Coast	0.11	0.32	0.13	0.33
South Central Coast	0.09	0.29	0.09	0.28
Central Highlands	0.07	0.26	0.10	0.30
Southeast	0.13	0.34	0.07	0.25
Mekong Delta	0.20	0.40	0.12	0.32
Household size	5.08	1.86	5.48	2.07

Table 3: Probit results

	Full sample		HCFP eligible only	
Variable	*Coef.*	*z*	*Coef.*	*z*
Poor In 2003	1.405	52.42	1.260	35.13
Decision 135 Beneficiary	0.531	25.45	0.387	11.07
Ethnic Minority	0.701	24.26	0.720	18.14
Ethnic minority x Mountainous province	0.287	7.70	0.309	6.99
Per Capita consumption	-1.19E-04	-4.97	4.65E-04	4.60
Per Capita consumption^2	8.79E-09	2.70	-1.67E-07	-5.58
Per Capita consumption^3	-2.26E-13	-1.47	1.71E-11	5.17
Per Capita consumption^4	1.73E-18	0.78	-5.38E-16	-4.63
Male household head	-0.006	-0.24	-0.090	-2.32
Age of household head	0.005	5.96	0.004	4.10
Literate household head	-0.322	-5.30	-0.302	-3.75
Education grade 1—household head	0.267	3.61	0.278	2.51
Education grade 2—household head	0.117	1.76	0.116	1.35
Education grade 3—household head	-0.010	-0.14	0.065	0.70
Education grade 4—household head	0.357	5.01	0.327	3.46
Education grade 5—household head	0.197	2.83	0.253	2.73
Education grade 6—household head	0.004	0.06	-0.074	-0.71
Education grade 7—household head	0.150	1.98	0.189	1.87
Education grade 8—household head	0.248	3.13	0.170	1.61
Education grade 9—household head	0.199	2.86	0.254	2.75
Education grade 10—household head	0.149	1.67	-0.019	-0.15
Education grade 11—household head	0.273	2.93	0.320	2.45
Education grade 12—household head	0.268	3.68	0.129	1.26
Urban	-0.073	-2.42	-0.044	-0.92
Northeast	0.057	1.46	-0.052	-0.88
Northwest	0.377	8.03	0.351	5.45
North Central Coast	0.088	2.29	0.113	1.98
South Central Coast	-0.002	-0.04	0.074	1.15
Central Highlands	0.533	12.91	0.595	9.56
Southeast	0.100	2.41	0.434	6.41
Mekong Delta	0.107	2.98	0.192	3.29
Household Size	0.013	2.41	0.022	3.18
Constant	-1.734	-21.88	-2.102	-14.26
Pseudo R^2	0.343		0.2357	
N	40,437		12,427	

Table 4: Trimming of sample

	Not covered by HCFP	Covered by HCFP	Total
Not in trimmed sample	1,884	474	2,358
In trimmed sample	5,916	4,153	10,069
Total	*7,800*	*4,627*	*12,427*

Table 5: Results of balancing tests

	Before matching		After matching w/ PS		After matching w/ kernel	
	Diff	t-stat	Diff	t-stat	diff	t-stat
Education Grade 1	0.106	5.71	-0.010	-0.39	-0.052	-1.78
Education Grade 2	0.118	6.37	0.040	1.39	-0.002	-0.08
Education Grade 3	0.037	1.97	0.079	3.05	0.040	1.67
Education Grade 4	0.141	7.60	0.026	0.83	0.016	0.60
Education Grade 5	0.021	1.13	0.073	2.55	0.049	2.05
Education Grade 6	-0.146	-7.91	0.003	0.13	-0.013	-0.70
Education Grade 7	0.012	0.65	-0.105	-2.35	0.012	0.49
Education Grade 8	-0.038	-2.03	0.018	0.83	-0.039	-1.63
Education Grade 9	-0.237	-12.87	0.094	4.96	0.004	0.18
Education Grade 10	-0.071	-3.85	-0.008	-0.39	-0.026	-1.23
Education Grade 11	-0.076	-4.10	-0.007	-0.41	-0.041	-2.02
Education Grade 12	-0.264	-14.32	-0.044	-2.11	-0.051	-3.01
Northeast	-0.112	-6.03	-0.076	-2.67	-0.114	-5.00
Northwest	0.394	21.61	0.019	0.51	0.023	0.79
North Central Coast	-0.073	-3.96	-0.010	-0.31	0.021	0.92
South Central Coast	-0.126	-6.83	-0.085	-2.30	0.009	0.40
Central Highlands	0.203	11.01	0.026	0.79	0.059	2.16
Southeast	-0.039	-2.09	0.112	5.76	0.076	3.73
Mekong Delta	0.034	1.81	0.046	1.57	0.015	0.58
Poor In 2003	0.774	44.95	-0.220	-7.84	0.027	1.05
Decision 135 Beneficiary	-0.166	-8.95	-0.044	-1.40	-0.018	-0.69
Ethnic Minority	0.583	32.77	-0.145	-5.49	0.029	1.23
Mountainous province	0.199	10.76	0.040	1.30	-0.011	-0.44
Per Capita Income	-0.565	-31.64	0.076	5.07	-0.018	-1.43
Male	0.014	0.73	0.074	2.21	0.033	1.31
Age	0.036	1.97	-0.046	-1.36	0.006	0.24
Literate	-0.432	-23.79	0.205	4.72	0.006	0.21
Urban	-0.183	-9.92	0.069	3.90	0.030	1.63
Household Size	0.285	15.53	0.017	0.55	0.094	3.67
Average (absolute difference)	0.189		0.063		0.033	
% change due to matching			-66%		-83%	

Table 6: Matching estimates of HCFP impact on out-of-pocket spending and utilization

	Outcome among HCFP beneficiaries		Outcome among nonbeneficiaries		Differences without matching		Differences via matching: propensity score weights		Differences via matching: kernel weights		
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	% change
Total out-of-pocket payments	138.013	20.56	231.602	26.80	-93.589	-7.58	18.340	2.04	-6.249	-0.62	-2.7%
Catastrophic (>10% nonfood consumption)	0.315	46.13	0.340	63.37	-0.025	-2.84	-0.033	-2.28	-0.027	-2.25	-7.9%
Outpatient expenses	51.001	10.29	73.342	14.40	-22.342	-2.93	12.837	1.94	5.805	0.80	7.9%
Inpatient expenses	65.050	6.21	102.626	6.21	-37.576	-1.64	26.522	2.01	18.115	1.25	17.7%
Outpatient expenses per visit	74.418	10.29	107.496	14.43	-33.078	-3.00	5.511	0.62	-1.211	-0.14	-1.1%
Inpatient expenses per admission	563.825	6.07	954.132	8.58	-390.307	-2.51	169.231	1.49	18.861	0.15	2.0%
Non-prescribed medicine expenses	32.066	26.05	46.653	41.45	-14.587	-8.37	2.446	1.32	-3.476	-1.47	-7.5%
Medical equipment expenses	1.020	9.32	2.383	16.09	-1.363	-6.49	0.124	0.90	-0.059	-0.48	-2.5%
# outpatient visits	0.834	23.13	0.809	32.11	0.025	0.58	0.224	4.18	0.168	3.20	20.8%
# inpatient spells	0.126	11.49	0.104	19.77	0.022	2.05	0.036	2.27	0.047	3.49	45.2%
Outpatient visits Yes	0.300	44.48	0.284	55.58	0.016	1.90	0.046	3.46	0.045	4.25	15.8%
Inpatient spells Yes	0.087	20.95	0.076	25.36	0.011	2.09	0.011	1.22	0.021	3.42	27.6%
Village station Yes	0.012	7.39	0.01	8.99	0.001	0.74	-0.003	-0.54	0.004	1.69	40.0%
Commune center Yes	0.174	31.21	0.099	29.31	0.075	12.17	0.033	2.77	0.048	5.55	48.5%
Regional clinic Yes	0.015	8.37	0.016	11.13	-0.001	-0.32	0.000	-0.01	0.001	0.21	6.3%
District hospital Yes	0.083	20.46	0.073	24.82	0.010	1.98	0.026	3.77	0.022	3.83	30.1%
Provincial hospital Yes	0.038	13.49	0.046	19.37	-0.008	-2.15	0.021	5.02	0.019	4.78	41.3%
Central hospital Yes	0.005	4.59	0.012	9.60	-0.007	-4.07	0.001	0.59	0.000	-0.24	0.0%
Other govt hospital Yes	0.002	3.32	0.003	4.91	-0.001	-0.71	0.001	0.68	0.000	0.00	0.0%
Private provider Yes	0.057	16.80	0.107	30.58	-0.050	-9.43	-0.010	-1.65	-0.021	-3.64	-19.6%
Traditional healer Yes	0.007	5.85	0.01	8.93	-0.003	-1.58	0.000	0.21	0.001	0.31	10.0%

Note: Expenditures are in thousands of VND, except in case of catastrophic out-of-pocket payments which is a share of the relevant subsample.

Table 7: Sensitivity of results to sample used in probit estimation

	Probit on full sample				Probit on eligible subsample			
	Differences via matching: propensity score weights		Differences via matching: kernel weights		Differences via matching: propensity score weights		Differences via matching: kernel weights	
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat
Total out-of-pocket payments	18.340	2.04	-6.249	-0.62	14.022	1.66	2.507	0.29
Catastrophic (>10% nonfood consumption)	-0.033	-2.28	-0.027	-2.25	-0.042	-3.22	-0.046	-4.54
Outpatient expenses	12.837	1.94	5.805	0.80	10.085	1.68	6.644	1.15
Inpatient expenses	26.522	2.01	18.115	1.25	27.640	2.20	24.040	1.86
Outpatient expenses per visit	5.511	0.62	-1.211	-0.14	-0.905	-0.10	-0.792	-0.09
Inpatient expenses per admission	169.231	1.49	18.861	0.15	122.522	1.08	67.531	0.54
Non-prescribed medicine expenses	2.446	1.32	-3.476	-1.47	-0.284	-0.16	-3.578	-2.04
Medical equipment expenses	0.124	0.90	-0.059	-0.48	-0.118	-1.45	-0.218	-2.42
# outpatient visits	0.224	4.18	0.168	3.20	0.197	3.83	0.144	2.73
# inpatient spells	0.036	2.27	0.047	3.49	0.042	2.94	0.044	3.35
Outpatient visits Yes	0.046	3.46	0.045	4.25	0.045	3.76	0.039	3.74
Inpatient spells Yes	0.011	1.22	0.021	3.42	0.018	2.51	0.020	3.13
Village station Yes	-0.003	-0.54	0.004	1.69	-0.001	-0.19	0.002	0.97
Commune center Yes	0.033	2.77	0.048	5.55	0.046	4.65	0.047	5.67
Regional clinic Yes	0.000	-0.01	0.001	0.21	0.001	0.25	0.001	0.27
District hospital Yes	0.026	3.77	0.022	3.83	0.025	3.97	0.022	3.77
Provincial hospital Yes	0.021	5.02	0.019	4.78	0.020	5.13	0.019	5.65
Central hospital Yes	0.001	0.59	0.000	-0.24	0.001	0.61	0.000	0.33
Other govt hospital Yes	0.001	0.68	0.000	0.00	0.001	0.55	0.000	0.26
Private provider Yes	-0.010	-1.65	-0.021	-3.64	-0.022	-3.48	-0.029	-4.82
Traditional healer Yes	0.000	0.21	0.001	0.31	0.001	0.41	0.001	0.27

Note: Expenditures are in thousands of VND, except in case of catastrophic out-of-pocket payments which is a share of the relevant subsample.

Table 8: Regression estimates of HCFP impact on out-of-pocket spending and utilization

	OLS full sample		OLS trimmed sample	
	coeff.	t-stat	coeff.	t-stat
Total out-of-pocket payments	-3.375	-0.29	10.154	1.06
Catastrophic (>10% nonfood consumption)	-0.040	-4.07	-0.033	-3.26
Outpatient expenses	8.119	0.91	6.505	0.74
Inpatient expenses	16.374	0.63	32.616	1.18
Outpatient expenses per visit	7.085	0.55	3.955	0.31
Inpatient expenses per admission	49.218	0.40	89.367	0.73
Non-prescribed medicine expenses	-3.119	-1.60	-4.310	-2.25
Medical equipment expenses	-0.168	-0.87	-0.156	-0.97
# outpatient visits	0.156	3.16	0.143	2.75
# inpatient spells	0.042	3.34	0.048	3.56
Outpatient visits Yes	0.045	4.61	0.040	3.94
Inpatient spells Yes	0.020	3.32	0.022	3.63
Village station Yes	0.002	0.92	0.003	1.42
Commune center Yes	0.059	8.15	0.060	7.71
Regional clinic Yes	0.002	0.80	0.002	0.79
District hospital Yes	0.021	3.60	0.019	3.09
Provincial hospital Yes	0.016	3.66	0.017	4.09
Central hospital Yes	0.000	-0.16	0.000	-0.02
Other govt hospital Yes	0.000	0.16	0.000	0.14
Private provider Yes	-0.035	-5.88	-0.037	-6.10
Traditional healer Yes	0.000	-0.01	0.001	0.27

Note: Expenditures are in thousands of VND, except in case of catastrophic out-of-pocket payments which is a share of the relevant subsample.

Table 9: Matching estimates of HCFP impact, by consumption decile

	Decile	Mean among uninsured	Differences no matching		Differences matching kernel weights		% change
			att	t(att)	att	t(att)	
Total out-of-pocket payments	1	54.435	-7.762	-0.31	-2.002	-0.64	-3.7%
	2	86.272	-8.545	-0.30	-4.458	-0.89	-5.2%
	3-10	307.536	-39.148	-2.25	-5.769	-0.27	-1.9%
Catastrophic (>10% nonfood consumption)	1	0.358	-0.070	-3.86	-0.047	-2.30	-13.1%
	2	0.350	-0.038	-1.83	-0.074	-3.01	-21.1%
	3-10	0.367	0.031	2.50	0.014	0.85	3.8%
Outpatient expenses	1	18.719	0.090	0.01	1.943	0.50	10.4%
	2	32.717	-7.616	-0.42	-11.575	-2.11	-35.4%
	3-10	108.391	4.211	0.39	19.119	1.12	17.6%
Inpatient expenses	1	12.013	3.611	0.08	5.283	1.58	44.0%
	2	26.927	3.962	0.07	14.543	2.12	54.0%
	3-10	158.347	-6.929	-0.21	32.438	1.01	20.5%
Outpatient expenses per visit	1	55.920	-15.126	-0.57	-12.087	-1.24	-21.6%
	2	77.020	-28.796	-1.09	-27.308	-2.66	-35.5%
	3-10	127.144	-10.788	-0.75	13.150	0.84	10.3%
Inpatient expenses per admission	1	173.250	55.393	0.16	82.233	2.18	47.5%
	2	404.226	-30.337	-0.07	32.496	0.46	8.0%
	3-10	1461.066	-297.793	-1.49	-93.321	-0.41	-6.4%
Non-prescribed medicine expenses	1	17.851	-1.903	-0.54	0.469	0.55	2.6%
	2	26.246	-1.554	-0.38	-3.258	-1.82	-12.4%
	3-10	54.333	-4.381	-1.79	-5.917	-1.25	-10.9%
Medical equipment expenses	1	0.756	-0.195	-0.45	0.183	2.97	24.2%
	2	1.468	-0.445	-0.90	-0.318	-1.15	-21.7%
	3-10	2.651	-1.402	-4.68	-0.109	-0.38	-4.1%
# outpatient visits	1	0.453	0.038	0.44	0.091	1.60	20.1%
	2	0.577	0.186	1.85	0.068	0.60	11.7%
	3-10	0.985	0.260	4.27	0.286	2.84	29.0%
# inpatient spells	1	0.071	-0.003	-0.15	-0.004	-0.27	-5.3%
	2	0.055	0.040	1.57	0.052	3.13	94.8%
	3-10	0.105	0.068	4.37	0.085	2.99	81.5%
outpatient visits Yes	1	0.221	0.003	0.19	0.017	0.92	7.7%
	2	0.242	0.051	2.56	0.021	0.89	8.6%
	3-10	0.305	0.065	5.46	0.081	5.24	26.6%
Inpatient spells Yes	1	0.063	-0.001	-0.11	-0.004	-0.37	-6.8%
	2	0.047	0.032	2.67	0.038	3.05	80.7%
	3-10	0.077	0.024	3.36	0.034	3.54	44.4%
Village station Yes	1	0.012	-0.001	-0.20	0.003	0.68	25.2%
	2	0.010	0.005	1.15	0.002	0.44	22.5%
	3-10	0.012	0.001	0.41	0.005	1.46	38.3%
Commune center Yes	1	0.139	-0.001	-0.09	-0.005	-0.33	-3.8%
	2	0.095	0.081	5.58	0.061	3.37	64.2%
	3-10	0.088	0.096	10.99	0.082	7.21	93.3%
Regional clinic Yes	1	0.016	-0.006	-1.17	-0.004	-0.77	-25.8%
	2	0.009	0.002	0.30	-0.003	-0.46	-34.6%
	3-10	0.013	0.004	1.20	0.006	1.49	49.5%
Dist hospital Yes	1	0.038	0.021	2.06	0.024	2.75	62.2%

	2	0.051	0.023	1.98	0.024	1.88	45.8%
	3-10	0.073	0.026	3.69	0.022	2.20	29.9%
Provincial hospital Yes	1	0.007	0.003	0.41	0.006	1.36	78.0%
	2	0.022	0.004	0.45	0.014	2.15	63.3%
	3-10	0.056	0.011	1.99	0.032	4.42	57.4%
Central hospital Yes	1	0.001	-0.001	-0.25	-0.001	-1.00	-92.0%
	2	0.004	-0.005	-1.09	-0.003	-1.45	-73.8%
	3-10	0.017	-0.004	-1.70	0.002	0.56	11.3%
Other govt hospital Yes	1	0.000	-0.001	-0.44	-0.001		
	2	0.002	-0.001	-0.33	0.001	0.72	34.7%
	3-10	0.004	0.001	1.05	0.000	0.08	4.8%
Private provider Yes	1	0.056	-0.007	-0.68	0.001	0.15	2.4%
	2	0.088	-0.036	-2.94	-0.051	-3.47	-57.4%
	3-10	0.136	-0.044	-5.95	-0.023	-2.52	-17.3%
Traditional healer Yes	1	0.005	0.001	0.18	-0.002	-0.63	-45.5%
	2	0.013	-0.003	-0.63	0.004	1.16	30.7%
	3-10	0.011	-0.002	-0.88	0.001	0.37	9.3%

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